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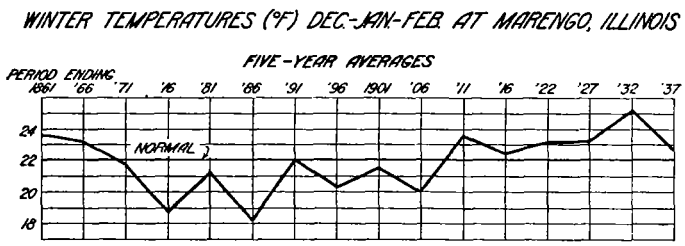
AN 80-YEAR TEMPERATURE RECORD

By CLARENCE J. ROOT

[Weather Bureau, Detroit, Mich., December 1939]

A number of temperature records in the United States cover periods of more than 75 years, but it is doubtful whether many, if any, include a period of 57 years by the same observer, on the same farm, and without the loss of a single month of record, as at Marengo, Ill.: In this vicinity, a weather record was begun in 1856. Nothing is known of the location or exposure during the first 4 years; but in 1860, John West James [1] began records and continued them until his last illness in 1917. The writer inspected this station and found the instruments to be properly exposed, and it is understood that they occupied the same location on the farm during the



entire 57 years. It was in Riley Township, 3 miles south of Marengo, and was carried in the records under the name "Riley." In 1918 the station was moved to Marengo, to a place several acres in extent at the extreme south edge of the town.[2] It was practically a rural exposure. This location was maintained until June 1937.

Thus, there is afforded an opportunity to compare the temperatures of 76 winters (December–January–February), with only 2 exposures and 2 observers during the entire period. For convenience of discussion, the first 4 winters are included, giving a record of 80 years.

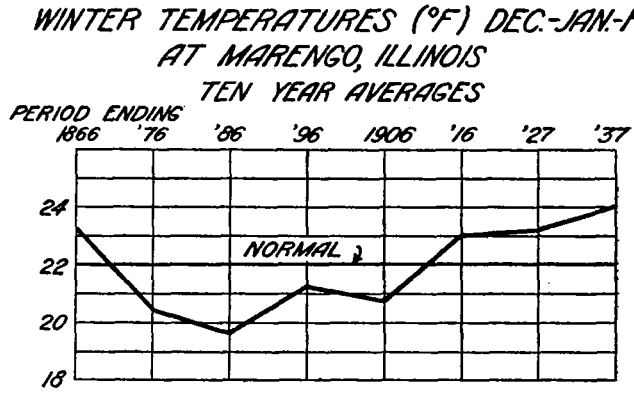
Winters are designated by the year in which January and February fell; thus the winter of 1857–58 is given as 1858. The average temperature of all 80 winters is 22.0°, and this value is termed a "normal."

Considering individual winters, it is found that at no time were there more than four consecutive ones above normal, except for the 6-year period from 1930 to 1935; 1936 was 7.4° below normal. Only twice were there more than four consecutive winters below normal, viz., 1833 to 1888, inclusive, and 1901 to 1904, inclusive. An interesting feature is the series of alternately warm and cold winters from 1873 to 1881, each being in sharp contrast with the previous one; to the nearest whole number, the departures from the normal during this series were −8°, 0°, −11°, +5°, −4°, +9°, −6°, +5°, −8°, +6°, and −8°. By decades the numbers of warm winters (more than 5° above normal) were: 2, 0, 2, 1, 0, 0, 2, and 2; and the numbers of cold winters (more than 5° below normal), 0, 2, 4, 3, 2, 0, 1, and 1. Of the 80 winters under discussion, the warmest were those of 1878 and 1932; other warm winters were 1858, 1863, 1890, 1918, 1920, and 1931. The coldest winter was that of 1874 (11.2°); other cold winters were 1873, 1881, 1883, 1885, 1893, 1904, and 1936.

Considering the winters by 5-year periods, the first two were above normal, passing normal on a downward curve at the 1871 pentad. They remained below normal through 1906, except that the pentad of 1891 was just normal. The coldest was that of 1886, 18.1°. Five-year averages from 1911 to 1937 were all above normal. The warmest was that of 1932, 25.2°, followed by a drop to 22.8° for the next and last pintad. It will be seen that winters grouped in 5-year averages were below normal from those of 1876 to 1906, inclusive, and above normal for those of 1861, 1866, and from 1911 to 1937, inclusive.

The Marengo winters have been averaged by decades also. That for 1866 was above normal, the next four below, and the last three above. The coldest 10-year period was the one ending in 1886, 19.6°; and the warmest, 1937, 24.0°.

In groups of 20 years the averages were 21.8°, 20.4°, 21.9°, and 23.6°, there being a rise of 3.2° from the second



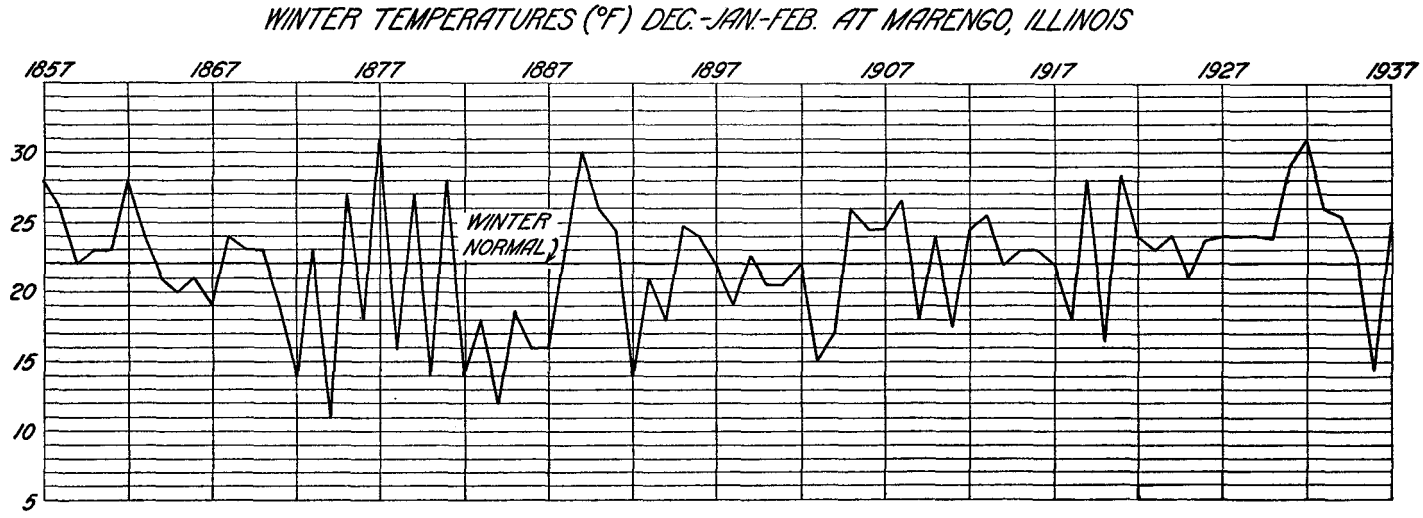
to the fourth. The average for the first 40 years was 21.1° as compared with 22.7° for the second 40 years, a rise of 1.6°.

Eliminating the fluctuations of individual winters and using only pentads and decades, there was a definite cold period at Marengo from 1872 to 1905 and a warm period from 1906 to 1937.

It might be suggested that the tendency to milder during the last two decades could be due to the change of location, but the Marengo records for 6 years before the change and 6 years after have been compared with those at Walnut where it is known that the exposure was not

[1] Missouri Weather Review, Nov. 1930, 58: 451–453.
[2] Installation made by Charles L. Mitchell, U. S. Weather Bureau, now at Washington, D. C.

changed during that time. Marengo is consistently colder than Walnut, being farther north. From these comparisons, it is found that the average difference between Marengo and Walnut was greater after the change, rather than smaller. The amount of this greater difference was 0.6° for January, 0.2° for February, 0.8° for December, and 0.6° for the winter period. It appears then that this warmer tendency after 1917 was real, and not due to the change of location and exposure.



The writer desires to express appreciation of the kindness of the present Illinois section director, E. W. Holcomb, in furnishing temperature data for Marengo.

RELATION OF RECENT GLACIER RECESSIONS TO PREVAILING TEMPERATURES

By J. B. KINCER

[U. S. Weather Bureau, Washington, November 1939]

The 1939 volume of the Transactions of the American Geophysical Union contains a report by the Committee on Glaciers, François E. Matthes, chairman, on the fluctuations of glaciers, with particular reference to recent recessions. This report is of more than passing interest in connection with the now recognized occurrence of comparatively long-time temperature trends. There has been a marked tendency to relatively high temperatures since the turn of the century. The following paragraphs are quoted from the report of the Committee:

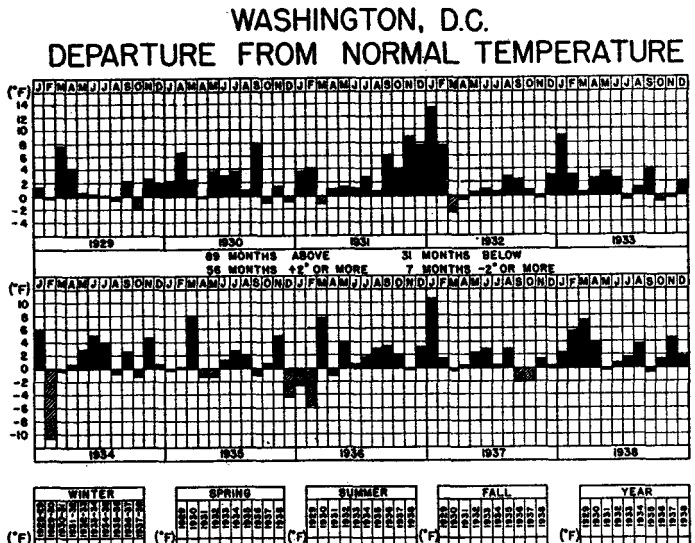


FIGURE 1.

The systematic measuring of glacier-oscillations from year to year has now been carried on in this country since 1931 (in one locality since 1918); in Europe it was inaugurated in 1894 and has been carried on continuously ever since, except for the unfortunate intermission that was caused by the World War. The value of the records obtained is not to be gaged by the variations indicated in any one year, or group of years, for such passing variations reflect merely the effects of short-time fluctuations in precipitation and temperature, and of various local factors as well. Taken collectively, however, in relation to long-time swings in climatic conditions comprising decades, centuries, and even thousands of years, they are found to possess great significance. That fact has long been recognized and, as a consequence, more than one glaciologist has been spurred on to search for data that would permit extension of the plotted curves back into historic times and even farther back into the past.

Successful searches made in the archives of the town of Chamonix, at the foot of the Mont Blanc Chain (Charles Rabot, Récents travaux glaciaires dans les Alpes françaises, La Géographie, v. 30, pp. 257–268, 1915), notably have served to extend the record for the glaciers of the French Alps back to 1580 and for the first time have made it clear that the general recession of those glaciers, which has been in progress during the last few decades, set in shortly after the middle of the nineteenth century. Previous to this there had been an epoch of relatively great glacier-extension that lasted, with minor fluctuations, about 250 years. The glaciers of the French Alps, therefore, are now merely receding back to the positions which they occupied toward the end of the sixteenth century.

More recently Thorarinsson, by searching old records in Iceland, has succeeded in tracing the history of glacier-oscillations on that island back to the year 875, when the Norsemen established their first colonies. This history, significantly, reveals that the present recession of the Iceland glaciers also began shortly after the middle of the nineteenth century (Sigurdur Thorarinsson, Grössenschwankungen der Gletscher in Island, Trans. Internat. Commissions of Snow and of Glaciers, Washington, 1939).

Doubtless it is no mere coincidence that recent observations by Munday on the great Klinaklini and Franklin glaciers in British Columbia, show that these glaciers also are receding from a maxi-